

**BSc Biochemistry**  
**For students entering Part 1 in 2014/5**

**UCAS code: C700**

Awarding Institution:	University of Reading
Teaching Institution:	University of Reading
Relevant QAA subject Benchmarking group(s):	Biosciences
Faculty:	Life Sciences Faculty
Programme length:	3 years
Date of specification:	16/Jun/2016
Programme Director:	Dr Amanda Callaghan
Programme Advisor:	Dr Philippa Darbre
Board of Studies:	Biological Sciences
Accreditation:	Recognised by the Royal Society of Chemistry

**Summary of programme aims**

The aim of the programme is to provide a sound education and training in biochemistry with a firm underpinning of chemistry. Emphasis is placed on the student being able to choose, as the course proceeds, those aspects of biochemistry provided by the participating departments that the student finds most rewarding. The subject matter of Parts 1 and 2 is broadly based with specialisation in Part 3 to provide a coherent, in-depth area of study which the student will select. They will receive training and be expected to demonstrate competence in laboratory techniques in biochemistry, the use of computers to access information resources and the use of statistical programmes for data analyses. Students will be expected to acquire individual and group communication skills in written work and in oral and poster presentations. The development of critical reading skills will be strongly encouraged.

**Transferable skills**

During the course of their studies at Reading, all students will be expected to enhance their academic and personal transferable skills. In following this programme, students will have had the opportunity to develop such skills, in particular relating to career management, communication (both written and oral), information handling, numeracy, problem-solving, team working in the laboratory, and use of information technology, and will have been encouraged to further develop and enhance the full set of skills through a variety of opportunities available outside their curriculum.

Students will also gain experience in the methodology of research and scholarship.

**Programme content**

The profile which follows states which modules must be taken (the compulsory part) and optional modules thought to be most appropriate for biochemists. Students must choose modules offered by the Schools of Biological Sciences, Chemistry, Food and Pharmacy, Agriculture, Policy and Development or other University of Reading Schools and Departments, subject to the agreement of the Programme Advisor, to a total of 120 credits in each Part.

**Part 1 (three terms)**

*Compulsory modules*

<i>Code</i>	<i>Title</i>	<i>Credits</i>	<i>Level</i>
BI1BA1	The Living Cell	10	4
BI1BA2	The Living Cell (2)	10	4
BI1BB2	Biochemistry and Metabolism	10	4
BI1BC2	Genes and Chromosomes	10	4
BI1BD1	Introductory Microbiology	10	4
BI1BF1	Laboratory and Study Skills for Biomedicine	10	4
BI1BG3	Practical Biochemistry	10	4
CH1OR2	Fundamentals of Organic Chemistry	10	4
CH1OR4	Further Fundamental Organic Chemistry for Biologists	10	4

*Optional modules (30 credits)*

Students will choose further modules, to achieve a total of 120 credits, from the list of recommendations below. Subject to agreement from the Programme Advisor, alternative modules may be chosen from the School of Biological Sciences or, exceptionally, from other Schools. Timetable restrictions may apply.

<i>Code</i>	<i>Title</i>	<i>Credits</i>	<i>Level</i>
AP1A18	Digestion and Nutrition	10	4
BI1BE1	Pathology: Introduction to Human Disease	10	4
BI1BH2	Human Physiology	20	4
BI1EG1	Plant Diversity, Structure and Utilisation	10	4
CH1PH2	Physical Processes for Biologists	10	4
LA1XX1	Institution-Wide Language Programme	20	4/5
PY1IN	Introduction to Neuroscience	10	4

## **Part 2 (three terms)**

### *Compulsory modules*

<i>Code</i>	<i>Title</i>	<i>Credits</i>	<i>Level</i>
ST2S2	Applied Statistics for the Life Sciences	10	5
BI2BA5	Clinical Biochemistry	10	5
BI2BD4	Life and Death of a Cell	10	5
BI2BE4	Pharmacology and Toxicology	10	5
BI2BI5	Immunology	10	5
BI2BK5	Molecular Biology of the Gene: Expression, Function and Analysis	10	5
BI2BL5	Protein Structure and Function	10	5
BI2BM34	Professional Career Development	10	5
BI2BP6	Practical Skills: Recombinant DNA Exercise	10	5

### *Optional modules*

Students will choose further modules, to achieve a total of 120 credits, from the list of recommendations below. Subject to agreement from the Programme Advisor, alternative modules may be chosen from the School of Biological Sciences or, exceptionally, from other Schools. Timetable restrictions may apply.

<i>Code</i>	<i>Title</i>	<i>Credits</i>	<i>Level</i>
BI2BB4	Endocrinology	10	5
BI2BC4	Human Development, Organogenesis and Anatomy	10	5
BI2BE4	Pharmacology and Toxicology	10	5
BI2BJ5	Microbiology: A Medical Perspective	10	5
BI2BO4	Virology	10	5
BI2BQ5	Clinical Haematology and Cellular Pathology	10	5
BI2BR4	Function of the Bacterial Cell	10	5
BI2EH4	Introduction to History and Philosophy of Science	10	5
BI2BT5	Introduction to Bioinformatics and Computational Biology	10	5
BI2BU45	Science Communication	10	5
BI2PBI*	Summer Placement in Biochemistry	10	5
CH2MC2	Medicinal Chemistry for Chemists	10	5
CH2OR1	Further Organic Chemistry	20	5
MM270	Practice of Entrepreneurship	20	5

\* Takes place in the summer vacation, after Part 1 examinations

## **Part 3 (three terms)**

### *Compulsory modules*

<i>Code</i>	<i>Title</i>	<i>Credits</i>	<i>Level</i>
BI3PROB	Research Project - Biomolecular	40	6
Or			
BI3PROD	Research Project - Biomolecular	20	6

### Optional modules

Students will choose further modules, to achieve a total of 120 credits, from the list of recommendations below. Subject to agreement from the Programme Adviser, alternative modules may be chosen from the School of Biological Sciences or, exceptionally, from other Schools. Timetable restrictions may apply.

<i>Code</i>	<i>Title</i>	<i>Credits</i>	<i>Level</i>
BI3BA7	Medical Genetics	10	6
BI3BB7	Selected Topics in Endocrinology and Endocrine Disease	10	6
BI3BC7	Bacterial Pathogens	10	6
BI3BD8	Cancer	10	6
BI3BE8	Cardiovascular Disease	10	6
BI3BF7	Cell Communication and Disease	10	6
BI3BG8	Mechanisms for Microbial Function	10	6
BI3BH8	Mammalian Reproduction	10	6
BI3BI8	Neurobiology	10	6
BI3BJ8	Viral Pathogens	10	6
BI3BP7	Systems Biology	10	6
BI3BR7	Structural Proteomics	10	6
BI3B67*	Microbiology Field Course	20	6
BI3BQ78	Bacterial Pathogens and Experimental Approaches	20	6
BI3EP7	Wildlife Diseases	10	6
BI3S78	Seminars in Biology	10	6
FB3NHD	Nutrition, Health and Disease	20	6
FB3NGLA	Genes, Lifestyle and Nutrition	10	6

**\*Takes place in Summer Term, after Part 2 examinations**

### Progression requirements

To gain a threshold performance at Part 1 and qualify for the CertHE, a student shall normally be required to achieve an overall average of 40% over 120 credits taken at Part 1 and a mark of at least 30% in individual modules amounting to not less than 100 credits. **In order to progress from Part 1 to Part 2** a student shall normally be required to achieve a threshold performance at Part 1.

To gain a threshold performance at Part 2 and qualify for the DipHE, a student shall normally be required to achieve:

an overall average of 40% over 120 credits taken at Part 2; and marks of at least 40% in modules amounting to not less than 80 credits; and

marks of at least 30% in individual modules amounting to not less than 120 credits

**In order to progress from Part 2 to Part 3** a student shall normally be required to achieve a threshold performance at Part 2.

Part 2 contributes one third of the overall assessment and Part 3 the remaining two thirds. In order to be eligible for Honours, students must gain an overall weighted average mark of 40%, at least 40% in modules amounting to 80 credits in Part 3, and must gain a mark of at least 40% in the Research Project module. For a Pass degree, candidates must have an average of at least 35% and at least 35% in modules amounting to 80 credits in Part 3 and must gain a mark of at least 35% in the Research Project module.

### Assessment and classification

The University's honours classification scheme is:

<i>Mark</i>	<i>Interpretation</i>
70% - 100%	First class
60% - 69%	Upper Second class
50% - 59%	Lower Second class
40% - 49%	Third class
35% - 39%	Below

	Honours
	Standard
0% - 34%	Fail

For the University-wide framework for classification, which includes details of the classification method, please see: [www.reading.ac.uk/internal/exams/Policies/exa-class.aspx](http://www.reading.ac.uk/internal/exams/Policies/exa-class.aspx).

The weighting of the Parts/Years in the calculation of the degree classification is:

### **Three-year programmes**

Part 2 one-third

Part 3 two-thirds

Teaching is organised in modules. Teaching in Part 1 consists of lectures, practical classes and small-group work. Modules can be assessed by 100% coursework but more usually are assessed by a combination of coursework and formal examination.

In Parts 2 and 3, lectures and practical classes continue to be major modes of teaching but they are increasingly supplemented by seminars and other group work. Modules can be 100% in-course assessed but are more usually assessed by a combination of coursework (20%) and formal examination (80%).

### **Admission requirements**

Entrants to this programme are normally required to have obtained:

#### **UCAS Tariff**

Grades BBB/ABC from three A levels including Biology at grade B plus one other science.

Grades ABB from three A levels including Biology will also be considered for applicants without a second science A level.

Acceptable science subjects: Chemistry, Physics, Maths, Further Maths, Statistics, Psychology, Geography, Applied Science, Environmental Studies, Geology.

Exclusions General Studies, Critical Thinking and Citizenship A levels, Key Skills and the Extended Project. International Baccalaureate: 30 points overall including 6 in Biology and 5 in a second science, both at higher level.

Applicants with other types of qualifications and mature students are also encouraged to apply.

**Admissions Tutor:** Dr David Leake

### **Support for students and their learning**

University support for students and their learning falls into two categories. Learning support is provided by a wide array of services across the University, including: the University Library, the Careers, Placement and Experience Centre (CPEC), In-sessional English Support Programme, the Study Advice and Mathematics Support Centre teams, IT Services and the Student Access to Independent Learning (S@il) computer-based teaching and learning facilities. There are language laboratory facilities both for those students studying on a language degree and for those taking modules offered by the Institution-wide Language Programme. Student guidance and welfare support is provided by Personal Tutors, School Senior Tutors, the Students' Union, the Medical Practice and advisers in the Student Services Centre. The Student Services Centre is housed in the Carrington Building and offers advice on accommodation, careers, disability, finance, and wellbeing, academic issues (eg problems with module selection) and exam related queries. Students can get key information and guidance from the team of Helpdesk Advisers, or make an appointment with a specialist adviser; Student Services also offer drop-in sessions and runs workshops and seminars on a range of topics. For more information see [www.reading.ac.uk/student](http://www.reading.ac.uk/student)

The Programme Advisor is available to offer advice on the choice of modules within the degree course.

### **Career learning**

#### **Career prospects**

After graduation, students will be qualified to undertake a career in a range of areas, or to use skills and problem-solving abilities in careers not directly related to biochemistry. Honours graduates will be eligible for graduate membership of the Institute of Biology which could lead to Chartered Biologist status. You will be qualified to enter a variety of careers, including work in industry (pharmaceuticals, biomedical, agrochemicals),

government service (research institutes and bodies such as the Environment Agency) and other public bodies. As numerate scientists you could also enter a wide variety of commercial and business occupations.

### **Opportunities for study abroad**

As part of the degree programme students have the opportunity to study abroad at an institution with which the University has a valid agreement.

### **Study Abroad:**

The Erasmus programme enables undergraduates to undertake project work for one term in their final year at one of a number of European Universities. Recent exchanges involving School of Biological Science students have taken place with the following: University of Tours, France; Odense University, Denmark; Uppsala University, Sweden; University College Cork, Ireland; University of Zaragoza, Spain; ENSA, Montpellier, France; University of Cagliari, Sardinia. Students also have the opportunity to go to Rostock University, Germany and Siena University, Italy.

### **Placement opportunities**

#### **Industrial Placement:**

Students who are interested in a scientific career, whether in industry, research or some other related field can apply for a year's placement between Parts 2 and 3.

### **Programme Outcomes**

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, skills, qualities and other attributes in the following areas:

#### **Knowledge and Understanding**

##### **A. Knowledge and understanding of:**

The fundamental concepts of the chemistry that supports biological processes such as metabolism, synthetic pathways and enzyme catalysis, underpinned by a knowledge of organic and other branches of chemistry, and their application to biological systems.

##### **Teaching/learning methods and strategies**

Compulsory and optional modules in Parts 1 and 2 introduce students to the chemistry that underpins living organisms at a variety of levels. A wide range of teaching strategies is employed in these modules, initially in relatively large-group lecture and practical sessions in Part 1. Smaller group teaching comes to dominate in Parts 2 and 3 and includes, depending on the modules chosen, additional teaching methods such as seminars, and tutorials in chosen biochemical aspects of the modules offered. In Part 3 students will be able to select a specific area of biochemistry for in-depth study and will undertake a research project with one-to-one supervision by a member of academic staff or equivalent.

##### *Assessment*

Most knowledge is tested through a combination of coursework and unseen formal examinations. Dissertations, oral and poster presentations also contribute.

#### **Skills and other attributes**

##### **B. Intellectual skills - *able to*:**

1. Think logically
2. Analyse and solve problems.
3. Organise tasks in a structured form

##### **Teaching/learning methods and strategies**

Rational thought and logical analysis is embedded throughout the programme, where solutions to key problems in biology have come about through the

4. Transfer appropriate knowledge and methods from one topic to another within the overall subject
5. Plan, conduct and write a report on an independent project
6. Design experiments to test specific hypotheses.

application of chemical and biochemical concepts and experiments. Basic skills associated with problem solving and data analysis are taught in a specific module using a variety of teaching methods. These skills are further developed in individual modules, for example in the Biochemistry and Metabolism module students will carry out a series of experiments that build on each other to address a specific scientific problem and then analyse and report on the results. In Part 3 students are able to enhance their critical and analytical skills by undertaking a project and to demonstrate this by presenting the results in an accompanying dissertation.

#### *Assessment*

Assessment is predominantly by examination. Critical evaluation of scientific data and literature is assessed in essay and dissertation form.

### **C. Practical skills - able to:**

1. Undertake biochemical laboratory tasks and techniques
2. Plan experiments and carry them out in the laboratory

### **Teaching/learning methods and strategies**

Practical laboratory skills will be taught in School teaching laboratories. Further practical skills may also form part of the Part 3 project, where students will be taught on a one-to-one basis how to design and implement a programme of scientific investigation.

#### *Assessment*

By practical laboratory reports.

### **D. Transferable skills - able to:**

1. Use IT
2. Communicate scientific ideas
3. Give oral and poster presentations
4. Work as part of a team
5. Use library resources
6. Manage time
7. Plan their career

### **Teaching/learning methods and strategies**

Modules in Parts 1 and 2 teach skills using a combination of seminars, demonstrations and practical approaches. In addition, other modules include aspects of different skills. Many modules include an integral component of written and oral communication as coursework. In Part 3 students undertake a detailed solo project during which their individual planning and time management skills are developed through contact with their academic supervisor.

#### *Assessment*

Numeracy and problem solving are assessed in course during experimental design modules. Other skills are assessed by coursework as part of the science communication module. In addition, most individual modules include written and oral coursework as 30% of the total module assessment. The use of IT is embedded throughout the course.

**Please note - This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each module can be found in the module description and in the programme handbook. The University reserves the right to modify this specification in unforeseen circumstances, or where the process of academic development and**

**feedback from students, quality assurance process or external sources, such as professional bodies, requires a change to be made. In such circumstances, a revised specification will be issued.**